ORDER NO HAD8801001C8

Service Manual

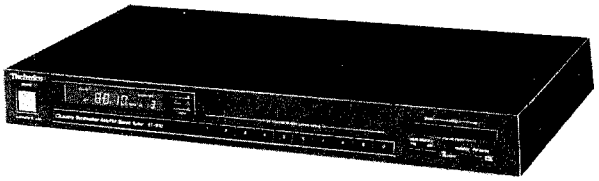
Tuner

QUARTZ Synthesizer
AM/FM Stereo Tuner

ST-600

Color

(S) .....Siiver Type
(K) .....Black Type



Area

Color	Area
(S)(K)	(EX) .....Continental Europe.
(S)(K)	(Ei) .....Italy.
(S)(K)	(EG).....F.R.Germany.
(S)(K)	(EH).....Holland.
(S)(K)	(XL) .....Australia.
(S)(K)	(XA).....Asia,Latin America,Middle Near East,Africa and Oceania.
(K)	(XB).....Saudi Arabia.

SPECIFICATIONS

(DIN 45 500)

■ FM TUNER SECTION

Frequency range	87.50 ~ 108.00 MHz (50 kHz-steps)
Sensitivity	1.5 µV (IHF, usable)
S/N 30 dB	1.3 µV (75Ω)
S/N 26 dB	1.2 µV (75Ω)
S/N 20 dB	0.9 µV (75Ω)
IHF 46 dB stereo quieting sensitivity	28 µV / 75Ω
Total harmonic distortion	
MONO	0.15%
STEREO	0.3%
S/N	
MONO	70 dB (78 dB,IHF)
STEREO	65 dB (70 dB,IHF)
Frequency response	20 Hz ~ 15 kHz, +0.5 dB ~ -1.5 dB
Alternate channel selectivity	
normal ±400 kHz	65 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	40 dB
IF rejection at 98 MHz	70 dB
Spurious response rejection at 98 MHz	70 dB
AM suppression	55 dB
Stereo separation	
1 kHz	40 dB
10 kHz	30 dB
Carrier leak	
19 kHz	-30 dB (-35 dB,IHF)
38 kHz	-45 dB (-50 dB,IHF)
Channel balance (250 Hz ~ 6,300 Hz)	± 1.5 dB
Limiting point	1.2 µV
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	75Ω (unbalanced)

■ AM TUNER SECTION

Frequency range	
(For Saudi Arabia)	531 kHz ~ 1602 kHz (9 kHz-steps)
	530 kHz ~ 1600 kHz (10 kHz-steps)
(For others)	522 kHz ~ 1611 kHz (9 kHz-steps)
	530 kHz ~ 1620 kHz (10 kHz-steps)
Sensitivity (S/N 20 dB)	20 µV,300 µV/m
Selectivity at 999 kHz (± 9 kHz)	50 dB
Image rejection at 999 kHz	40 dB
IF rejection at 999 kHz	60 dB

■ GENERAL

Output voltage	0.3V (0.6V,IHF)
Power consumption	9W
Power supply	
For Australia	AC 50 Hz/60 Hz,240V
For continental Europe	AC 50 Hz/60 Hz,220V
For others	AC 50 Hz/60 Hz,110V/117V/220V/240V
Dimensions (W x H x D)	430 x 53 x 220 mm (16-15/16" x 2-2/32" x 8-21/32")
Weight	2.0 kg (4.4 lb.)

Notes:
1. Specifications are subject to change without notice. Weight and dimensions are approximate.
2. Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

ST-600

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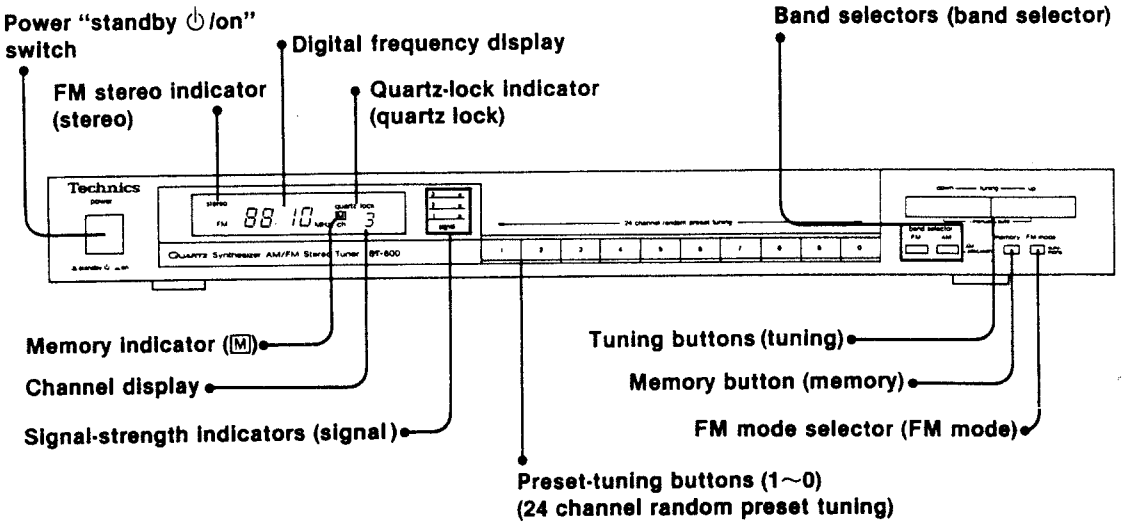
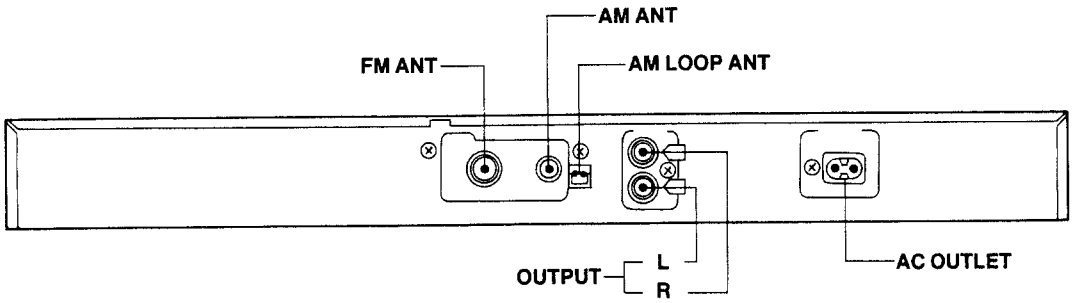
■ LOCATION OF CONTROLS

•Front panel

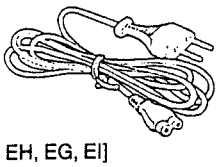


•Rear panel



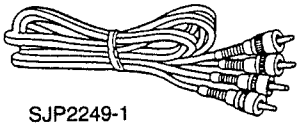
■ ACCESSORIES

• AC power supply cord..... 1



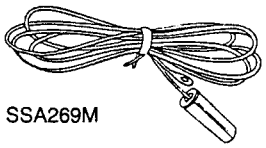
SJA163 [XL]
SJA183 [XB]
SJA185 [XA]
SJA187 [EX, EH, EG, EI]

• Stereo connection cable..... 1



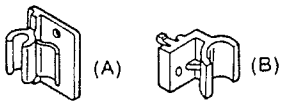
SJP2249-1

• FM indoor antenna..... 1



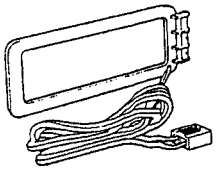
SSA269M

• AM antenna holders..... 2



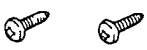
SMA231M SMA233-1M

• AM loop antenna 1



SPB1139-1

• Screws 2

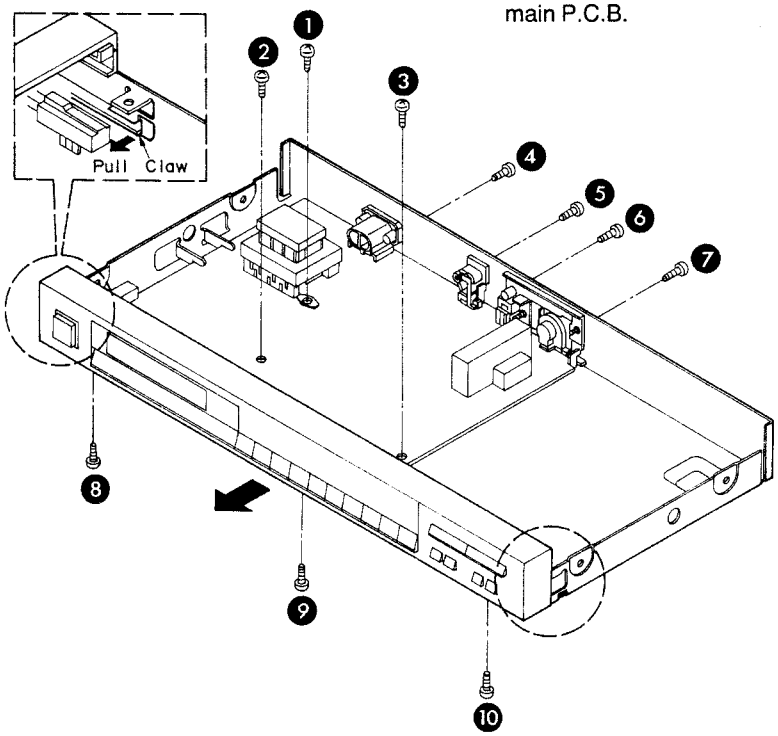


XTN3+10AFZ

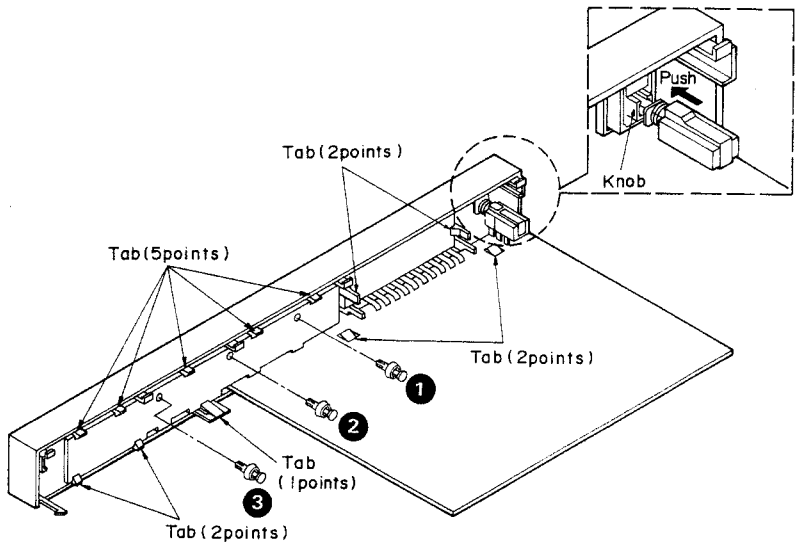
■ DISASSEMBLY INSTRUCTIOINS

Ref. No. 1	How to remove the cabinet
Procedure 1	●Remove the 4 screws.

Ref. No. 2	How to remove the main P.C.B.
Procedure 1→2	1. Remove the 10 screws (❶~❿). 2. Remove the 2 claws. 3. Slightly pull the front panel toward you and remove the main P.C.B.



Ref. No. 3	How to remove the front panel
Procedure 1→2→3	1. Remove the power switch knob. 2. Remove the 3 nylon rivets (❶~❸). 3. Remove the 12 tabs.



■ MEASUREMENTS AND ADJUSTMENTS

FM ADJUSTMENT

Control positions and equipment used

- FM signal generator(FM-SG)
- Stereo modulator
- Distortion analyser
- DC electronic voltmeter(EVM)
- Frequency counter
- Choke coil(100μH)
- Resistor(100kΩ)

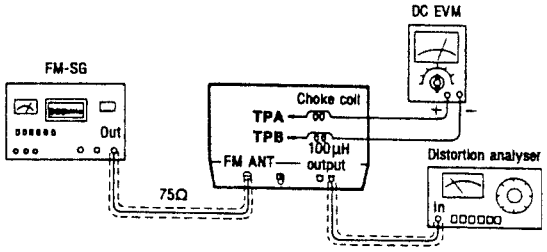
Note: For Z202(AM-IFT), Z201(AM ANT and OSC coil), Z321(FM ANT coil), L321 (L.P.F), L322(L.P.F) and L324(L.P.F), they are supplied as adjusted parts. So, do not turn the cores of the parts.

FM MONO DISTORTION ADJUSTMENT

1.Test equipment connection is shown in figure.
2.Set the unit to **"FM"** mode.
3.Set the radio frequency display and signal generator to **100.10MHz**.
4.Adjust the core of **T201** so that the voltage measured in signal mode is **0mV(0±20mV)** in 300mV range.
5.Adjust **T202** so that the distortion factor of L-CH is minimized.
6.Repeat steps 4 and 5.
7.Make sure that the distortion factors of L-CH and R-CH are nearly the same and minimum.

Note: The adjusting screwdriver used should be made of resin.

FM SIGNAL GENERATOR CONDITION
Modulation 100%
Modulation frequency 1kHz
Output level.....66dB



TPA = TP201 , TPB = TP202

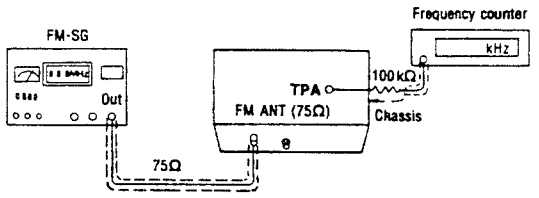
MPX VCO ADJUSTMENT

1.Test equipment connection is shown in figure.
2.Set the unit to **"on/auto"** position.
3.Set the radio dial and signal genarator to **100.10MHz**.
4.Adjust **VR301** for **19kHz±30Hz** on frequency counter reading.

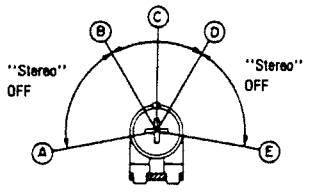
USING ALTERNATE SYSTEM

1.Receive the stereo broadcast.
2.Adjust **VR301** until stereo indicator lights up. Fix the arm of **VR301** as shown in figure.

FM SIGNAL GENERATOR CONDITION
Modulation 100%
Modulation frequency 0kHz
Output level.....66dB



TPA = TP301



TPA

Ⓐ−Ⓑ,
Ⓓ−Ⓔ..... "Stereo" OFF position
Ⓑ−Ⓓ..... "Stereo" ON position (Indicator lighting)
Ⓒ..... Adjust point of pilot circuit

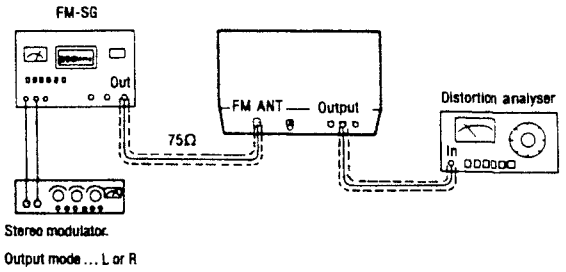
TPA = VR301

FM STEREO DISTORTION ADJUSTMENT
(EG) and (EI) only

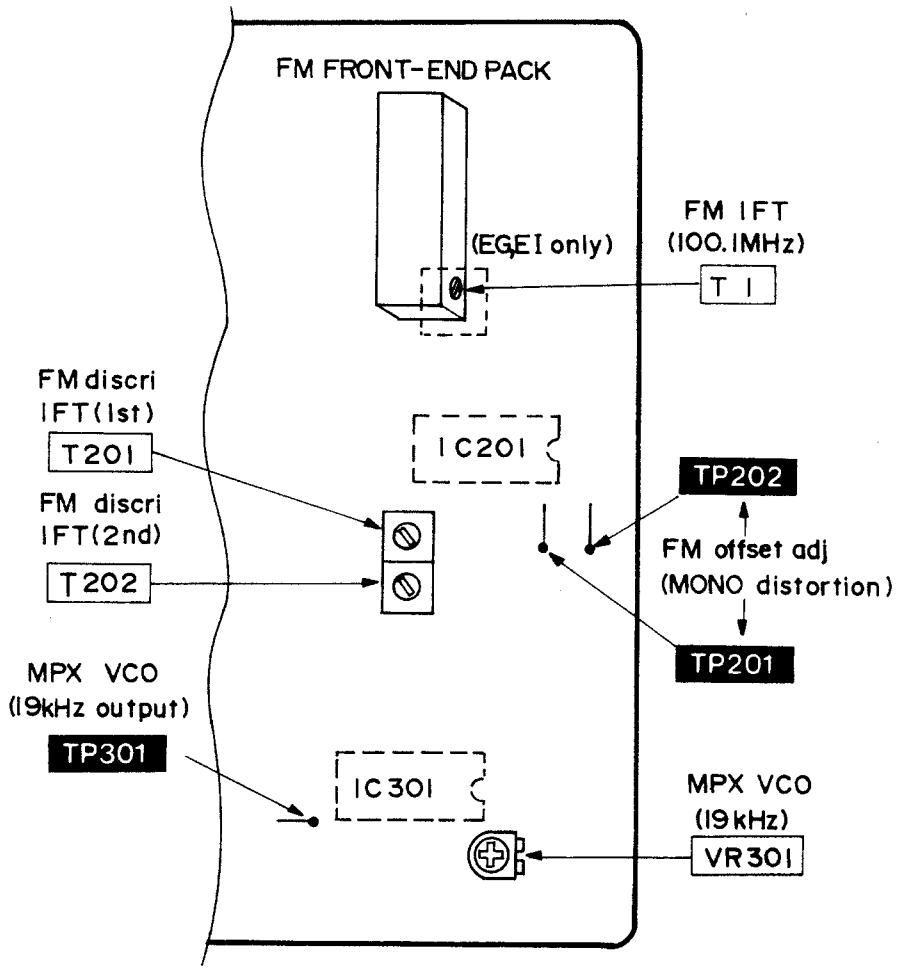
1.Test equipment connection is shown in figure.
2.Set the unit to **"FM"** mode.
3.Set the radio frequency display and signal generator to **100.10MHz.**
4.Adjust **T1** so that the distortion factor of L-CH is minimized.
5.Make sure that the distortion factors of L-CH and R-CH are nearly the same and minimum.

Note: The adjusting screwdriver used should be made of resin.

FM SIGNAL GENERATOR CONDITION
Modulation ......"L"mode or "R"mode 90%, Pilot 10%
Modulation frequency .....1kHz(Pilot 19kHz)
Output level.....66dB



• Adjustment Points



■ RESISTORS & CAPACITORS

Notes : * Important safety notice :
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.)
Parts without these indications can be used for all areas.

Numbering System of Resistor

Example:

ERD	25	F	J	102
Type	Wattage (1/4W)	Shape	Tolerance	Value (1KΩ)
ERX	2	AN	J	471
Type	Wattage (2W)	Shape	Tolerance	Value (470Ω)

Numbering System of Capacitor

Example:

ECKD	1H	102	Z	F
Type	Voltage (50V)	Value (0.001μF)	Tolerance	Peculiarity
ECEA	50	M	330	
Type	Voltage (50V)	Pecliarity	Value (33μF)	

- Capacity are in microfarads (μF) unless specified otherwise, P = Pico-farads (pF) F = Farads (F).
- Resistance are in ohms (Ω), unless specified otherwise, 1K = 1,000Ω, 1M = 1,000kΩ

Resistor Type		Wattage		Tolerance
ERD	: Carbon	10 : 1/8W	12 : 1/2W	J : ±5%
ERG	: Metal Oxide	14 : 1/4W	25 : 1/4W	F : ±1%
ERQ	: Fuse Type Metal	1A : 1W	18 : 1/8W	G : ±2%
ERX	: Metal Film	S2 : 1/4W	S1 : 1/2W	J : ±5%
ERD L	: Carbon (chip)	2F : 1/4W	50 : 1/2W	K : ±10%
ERO K	: Metal Film (chip)	2A : 2W	3A : 3W	M : ±20%
ERC	: Solid	6G : 1/10W	8G : 1/8W	
ERF	: Incombustible Box-Shaped			
ERM	: Wire-Wound			
RRJ	: Cip Resistor			
ERJ	: Cip Resistor			

Capacitor Type		Voltage		Tolerance
ECE	: Electrolytic	0J : 6.3V	1A : 10V	K : ±10%
ECCD	: Ceramic	1C : 16V	1E : 25V	M : ±20%
ECKD	: Ceramic Capacitor	1H : 50V	1V : 35V	Z : +80 % −20
ECQM	: Poyester	50 : 50V	05 : 50V	
ECQP	: Polypropylene	2H : 500V	2A : 100V	J : ±5%
ECG	: Ceramic	1 : 100V	1J : 63V	G : ±2%
ECEA N	: Non Polar Electrolytic	KC : 400V AC		F : ±1%
QCU	: Ceramic (Chip Type)	KC : 125V AC		C : ±0.25pF
ECUX	: Ceramic (Chip Type)	(UL)		D : ±0.5pF
ECF	: Semiconductor			
EECW	: Liquid electrolyte double layer capacitor			

Ref. No.	Part No.	Value.
RESISTORS(VALUE,WATTAGE)		
R101	ERDS2TJ103	10K 1/4
R102	ERDS2TJ103	10K 1/4
R104	ERDS2TJ102	1K 1/4
R105	ERDS2TJ561	560 1/4
R106	ERDS2TJ562	5.6K 1/4
R107	ERDS2TJ103	10K 1/4
R108	ERDS2TJ151	150 1/4
R201	ERDS2TJ332	3.3K 1/4
R202	ERDS2TJ824	820K 1/4
R203	ERDS2TJ122	1.2K 1/4
R204	ERDS2TJ474	470K 1/4
(EG, EI)		
R204	ERDS2TJ824	820K 1/4
(EX, EH, XA) (XL, XB)		
R205	ERDS2TJ221	220 1/4
(EG, EI)		
R205	ERDS2TJ391	390 1/4
(EX, EH, XL) (XB, XA)		
R206	ERDS2TJ561	560 1/4
R207	ERDS2TJ822	8.2K 1/4
R208	ERDS2TJ102	1K 1/4
R209	ERDS2TJ471	470 1/4
R211	ERDS2TJ222	2.2K 1/4
R212	ERDS2TJ153	15K 1/4
R213	ERDS2TJ104	100K 1/4
R214	ERDS2TJ824	820K 1/4
R215	ERDS2TJ822	8.2K 1/4
R216	ERDS2TJ563	56K 1/4
R217	ERDS2TJ223	22K 1/4
R218	ERDS2TJ123	12K 1/4
R219	ERDS2TJ562	5.6K 1/4
R220	ERDS2TJ103	10K 1/4
R221	ERDS2TJ104	100K 1/4
R222	ERDS2TJ473	47K 1/4
R227	ERDS2TJ104	100K 1/4
R228	ERDS2TJ123	12K 1/4
R229	ERDS2TJ102	1K 1/4
R230	ERDS2TJ104	100K 1/4
R231	ERDS2TJ102	1K 1/4
R232	ERDS2TJ122	1.2K 1/4
R233	ERDS2TJ684	680K 1/4
R234	ERDS2TJ103	10K 1/4
R235	ERDS2TJ471	470 1/4
R237	ERDS2TJ151	150 1/4
(EX, EH, XA) (XL, XB)		
R240	ERDS2TJ152	1.5K 1/4
(EG, EI)		
R247	ERDS2TJ103	10K 1/4
R301	ERDS2TJ393	39K 1/4
R302	ERDS2TJ151	150 1/4
R303	ERDS2TJ223	22K 1/4
R304	ERDS2TJ223	22K 1/4
R305	ERDS2TJ272	2.7K 1/4
(EG, EI)		
R305	ERDS2TJ332	3.3K 1/4
(EX, EH, XA) (XL, XB)		
R306	ERDS2TJ272	2.7K 1/4
(EG, EI)		
R306	ERDS2TJ332	3.3K 1/4
(EX, EH, XA) (XL, XB)		
R307	ERDS2TJ104	100K 1/4
(EX, EH, XA) (XL, XB)		
R307	ERDS2TJ562	5.6K 1/4
(EI, EG)		
R308	ERDS2TJ104	100K 1/4
(EX, EH, XA) (XL, XB)		
R308	ERDS2TJ562	5.6K 1/4
(EI, EG)		
R309	ERDS2TJ104	100K 1/4
(EG, EI)		
R309	ERDS2TJ224	220K 1/4
(EX, EH, XA) (XL, XB)		
R311	ERDS2TJ102	1K 1/4
R312	ERDS2TJ153	15K 1/4
R313	ERDS2TJ473	47K 1/4
R314	ERDS2TJ473	47K 1/4
R315	ERDS2TJ103	10K 1/4
R316	ERDS2TJ102	1K 1/4
R317	ERDS2TJ473	47K 1/4
R321	ERDS2TJ153	15K 1/4
(EG, EI)		
R322	ERDS2TJ153	15K 1/4
(EG, EI)		
R325	ERDS2TJ102	1K 1/4
(EG, EI)		
R326	ERDS2TJ102	1K 1/4
(EG, EI)		
R327	ERDS2TJ183	18K 1/4
(EG, EI)		
R402	ERDS2TJ221	220 1/4
R403	ERDS2TJ181	180 1/4
R404	ERDS2TJ151	150 1/4
R405	ERDS2TJ122	1.2K 1/4
R406	ERDS2TJ561	560 1/4
R408	ERDS2TJ182	1.8K 1/4
R409	ERDS2TJ563	56K 1/4
R702	ERDS2TJ102	1K 1/4
R703	ERDS2TJ221	220 1/4
R704	ERDS2TJ102	1K 1/4
R710	ERDS2TJ103	10K 1/4
R711	ERDS2TJ104	100K 1/4
R716	ERDS2TJ101	100 1/4
R717	ERDS2TJ101	100 1/4
R725	ERDS2TJ103	10K 1/4
R901	ERDS2TJ103	10K 1/4
R902	ERDS2TJ103	10K 1/4
R903	ERDS2TJ103	10K 1/4
R915	ERDS2TJ821	820 1/4
R916	ERDS2TJ272	2.7K 1/4
R917	ERDS2TJ103	10K 1/4
R918	ERDS2TJ224	220K 1/4
R922	ERDS2TJ681	680 1/4
R923	ERDS2TJ104	100K 1/4
R924	ERDS2TJ392	3.9K 1/4
R925	ERDS2TJ473	47K 1/4
R930	ERDS2TJ104	100K 1/4

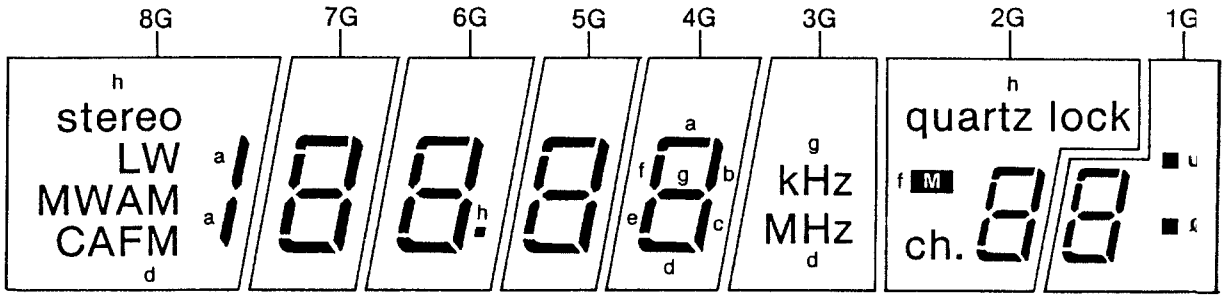
Ref. No.	Part No.	Value.
R931	ERDS2TJ104	100K 1/4
R932	ERDS2TJ104	100K 1/4
R933	ERDS2TJ104	100K 1/4
R946	ERDS2TJ101	100 1/4
R950	ERDS2TJ683	68K 1/4
R951	ERDS2TJ683	68K 1/4
R952	ERDS2TJ683	68K 1/4
R953	ERDS2TJ683	68K 1/4
R954	ERDS2TJ683	68K 1/4
R960	ERDS2TJ103	10K 1/4
R961	ERDS2TJ273	27K 1/4
CAPACITORS(VALUE,VOLTAGE)		
C101	RCBS1H150JCY	15P 50
C102	RCBS1H150JCY	15P 50
C103	ECBT1H102KB5	0.001 50
C104	RCBS1H181KBY	180P 50
C105	ECEA0JU101	100 6.3
C106	ECKD1H103PF	0.01 50
C107	ECKD1H103PF	0.01 50
C108	ECEA25M4R7	4.7 25
C109	ECEA1CU330	33 16
C110	ECBT1H102KB5	0.001 50
C201	ECKD1H103PF	0.01 50
C202	ECKD1H103PF	0.01 50
C204	RCBC1H470JLY	47P 50
C205	ECKD1H223PF	0.022 50
C206	RCBS1H150JCY	15P 50
C208	ECEA0JU101	100 6.3
C209	ECEA1EK4R7	4.7 25
C210	ECKD1H223PF	0.022 50
C211	ECKD1H223PF	0.022 50
C212	ECKD1H223PF	0.022 50
C213	RCBC1H101KBY	100P 50
C214	ECEA1CKS100	10 16
C215	ECKD1H103PF	0.01 50
C216	ECEA1CKS100	10 16
C217	ECEA1HK010	1 50

Ref. No.	Part No.	Value.
C220	ECEA1CKS100	10 16
C222	ECFTD473KXL	0.047 25
C225	RCBS1H180JCY	18P 50
C226	ECKD1H103PF	0.01 50
C227	ECEA1CKS100	10 16
C230 (EI, EG)	RCBC1H471KBY	470P 50
C301	ECEA1CU101	100 16
C302	ECEA1HKR47	0.47 50
C303	ECEA1HK010	1 50
C304	ECEA1VK3R3	3.3 35
C305	ECEA1VK3R3	3.3 35
C306	ECEA1VK3R3	3.3 35
C307 (EX, EH, XA) (XL, XB)	ECFTD153KXL	0.015 25
C307 (EG, EI)	ECFTD392KXL	0.0039 25
C308 (EX, EH, XA) (XL, XB)	ECFTD153KXL	0.015 25
C308 (EG, EI)	ECFTD392KXL	0.0039 25
C310	ECFTD473KXL	0.047 25
C311	ECQP1471JZ	470P 125
C312	ECEA1CKS100	10 16
C313 (EG, EI)	ECBT1H102KB5	0.001 50
C313 (EX, EH, XA) (XL, XB)	RCBS1H181KBY	180P 50
C314 (EG, EI)	ECBT1H102KB5	0.001 50
C314 (EX, EH, XA) (XL, XB)	RCBS1H181KBY	180P 50
C321 (EG, EI)	ECEA1CKS100	10 16

Ref. No.	Part No.	Value.
C323 (EG, EI)	ECFTD332KXL	0.0033 25
C324 (EG, EI)	ECFTD332KXL	0.0033 25
C325 (EG, EI)	ECCD1H330KC	33P 50
C326 (EG, EI)	ECKD1H103PF	0.01 50
C327 (EG, EI)	ECBT1H102KB5	0.001 50
C401	ECEA1VK3R3	3.3 35
C701 (EG, EI)	ECEA1CU222	2200 16
C701 (EX, EH, XA) (XL, XB)	ECEA1EU102	1000 25
C702	ECEA1EU102	1000 25
C704 (EX, EH, XA) (XL, XB)	ECKD1H103PF	0.01 50
C705	ECEA1CU221	220 16
C707	ECKD1H103PF	0.01 50
C710	ECKD2H102ZF	0.001 500
C711	ECKD1H103PF	0.01 50
C716	ECEA1VU101	100 35
C717	ECKD2H102ZF	0.001 500
C718	ECKD1H103PF	0.01 50
C719	ECEA1VU101	100 35
C720 (EG, EI)	ECKD1H103PF	0.01 50
C725	ECEA1VK100B	10 35
C726	ECEA1VK3R3	3.3 35
C902	ECKD1H103PF	0.01 50
C912	ECEA0JS102	1000 6.3
C913	ECKD1H103PF	0.01 50
C914	ECEA0JS102	1000 6.3
C915	ECEA1HKR22	0.22 50
C916	RCBC1H101KBY	100P 50
C917	RCBS1H121KBY	120P 50

■ DESCRIPTION OF FL PANEL

• GRID ASSIGNMENT

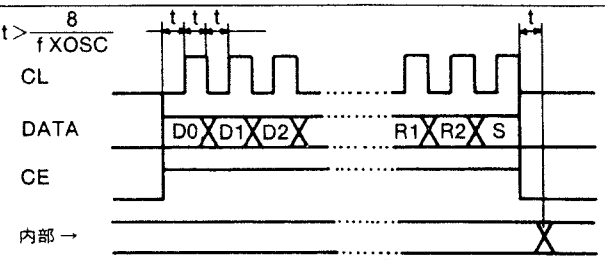


Note: The grid of 3G and 8G are used for external connection.

• PIN CONNECTION

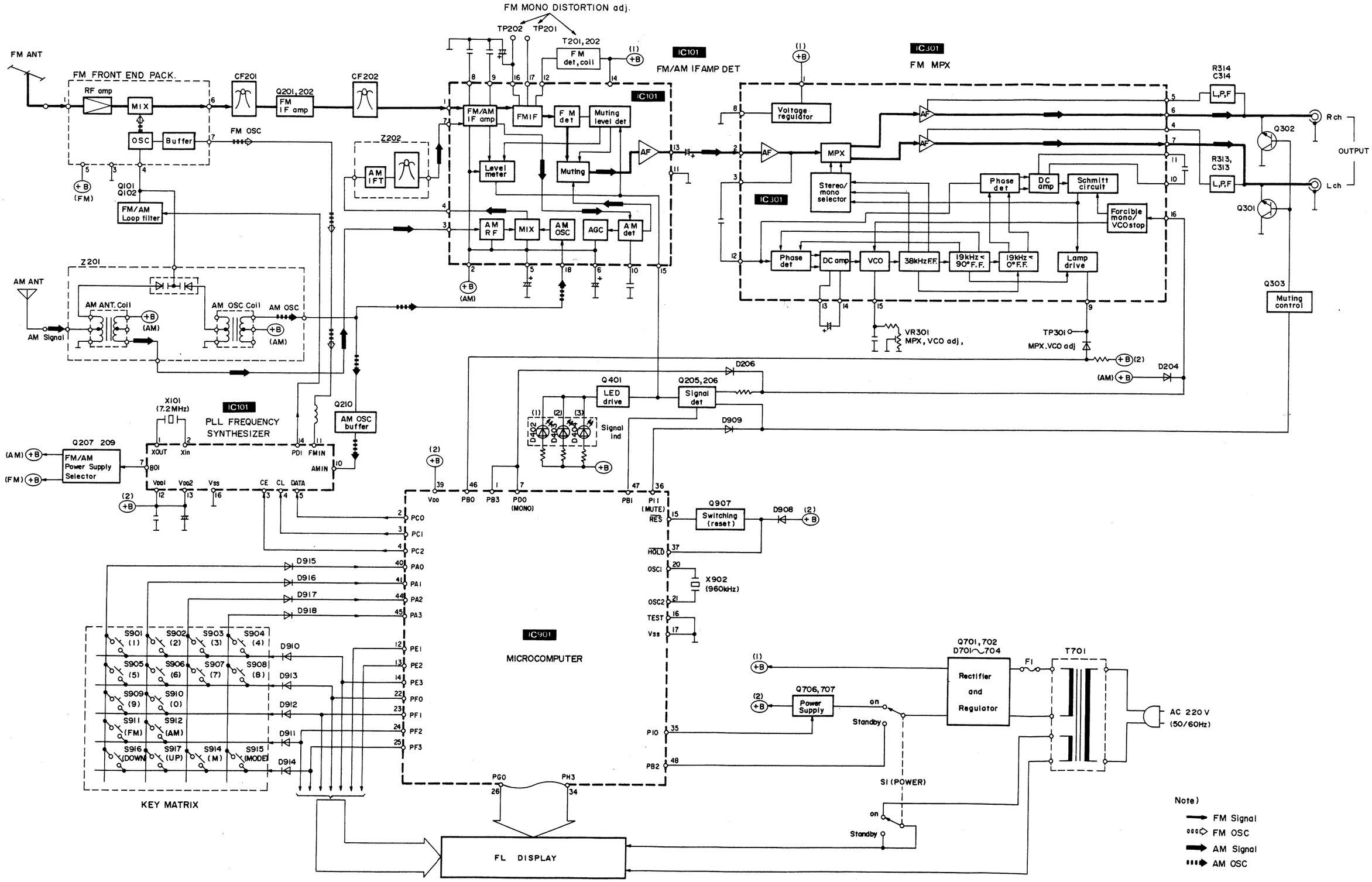
PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
CONNECTION	F1	F1	NP	h	f	8G	AM	MW	CA	LW	7G	c	a	6G	e	d	g	5G
PIN NO.	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
CONNECTION	b	NP	4G	NP	NP	3G	NP	NP	ch	2G	NP	u	1G	ℓ	NP	F2	F2	

■ FUNCTION OF TERMINAL (IC901: LC6512A3377)

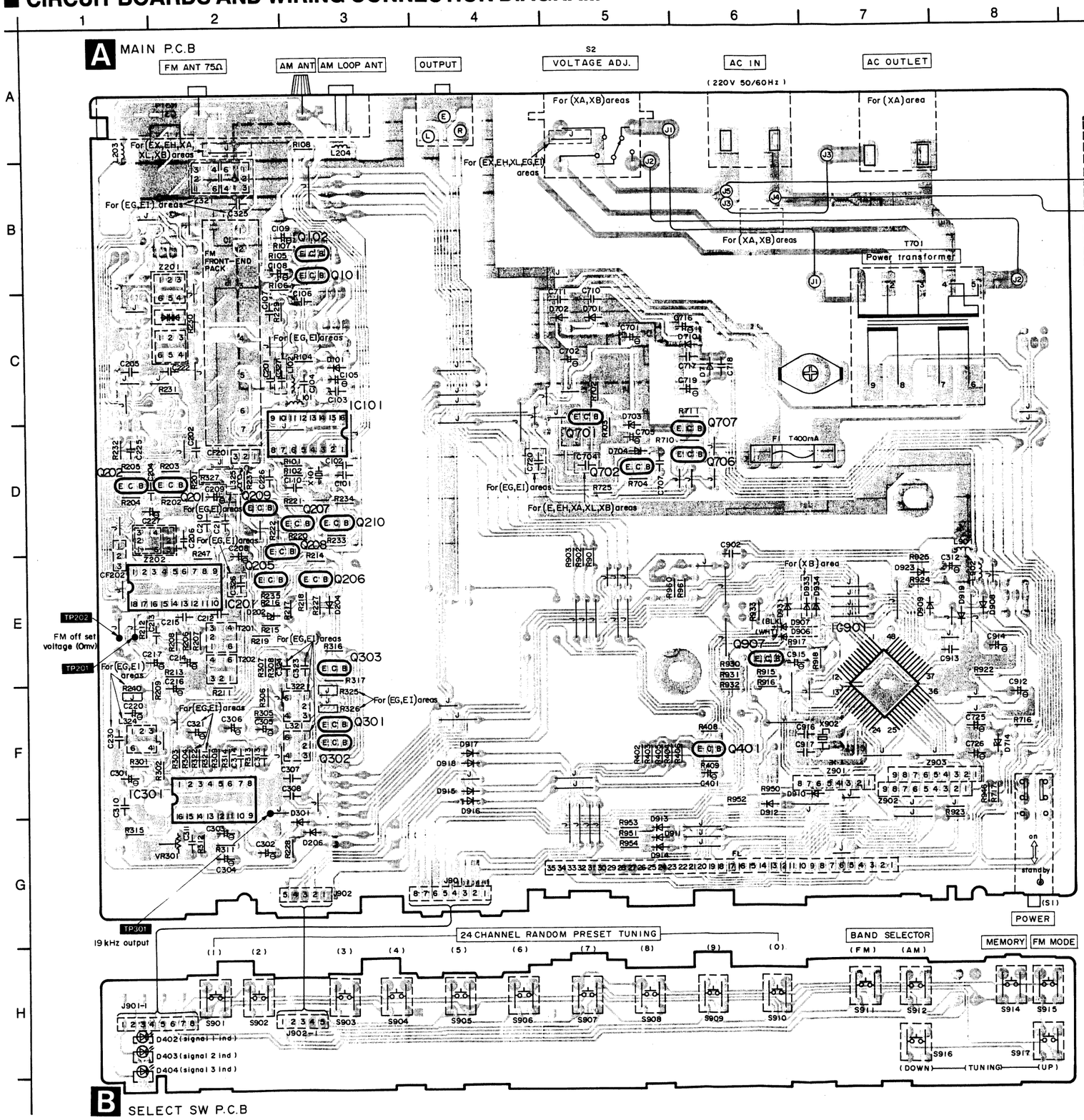
PIN NO.	IN/OUT	MARK	DESCRIPTION OF TERMINAL
1	INPUT	PB3	Computer drive terminal.
2	OUTPUT	DATA	Data output $t > \frac{8}{f\,XOSC}$  f XOSC: Crystal OSC D0~D13: Divided frequency data R0~R2: Reference frequency data
3		CL	
4		CE	
5	—	PC3	Not used in this unit.
6	—	NC	Not used in this unit.
7	OUTPUT	PD0	Auto/mono changeover terminal. (auto → 0V, mono → 5V)
8	OUTPUT	PD1	Computer drive terminal.
9	—	PD2	Not used in this unit.
10		PD3	
11		PE0	
12 ~ 14 • 22 ~ 25	OUTPUT	PE1 ~ PE3 • PF0 ~ PF3	Digital signal terminal for display. Terminal for key return signal to external key matrix.
15	INPUT	$\overline{RES}$	Reset terminal.
16	—	TEST	Ground terminal.
17		V_{SS}	
18	—	NC	Not used in this unit.
19			
20	INPUT	OSC1	Connecting terminal for crystal oscillator.
21	OUTPUT	OSC2	
26 ~ 29 • 31 ~ 34	OUTPUT	PG0 ~ PG3 • PH0 ~ PH3	Segment signal terminal for display.
30	—	NC	Not used in this unit.
35	OUTPUT	P10	Control signal terminal for relay (RLY701).
36	OUTPUT	P11	Muting signal terminal. (Muting → High level)
37	INPUT	$\overline{HOLD}$	Terminal for power failure detection.
38	INPUT	$\overline{INT}$	Terminal for remote control cord.
39	INPUT	V_{DD}	Power supply terminal of device. Voltage of 5V is supplied during operation of device.
40	INPUT	PA0 ~ PA3	Terminal for key return signal to external key matrix. [KEY MATRIX]
41			
44			
45			
42 • 43	—	NC	Not used in this unit.
46	INPUT	PB0 ~ PB2	Stereo signal terminal.
47			SD signal terminal.
48			Tuner select terminal. (Ground connection)

Pin No.	45	44	41	40
14	CH4	CH3	CH2	CH1
22 • 23	CH8	CH7	CH6	CH5
	—	—	CH0	CH9
24	—	—	AM	FM
25	MODE	MEMORY	UP	DOWN

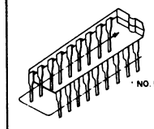
■ BLOCK DIAGRAM



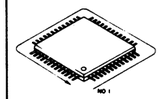
■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM



■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

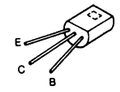


AN7470	16 Pin
LM7001	16 Pin
AN7273A	18 Pin

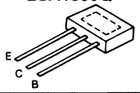


LC6512A3377	48 pin

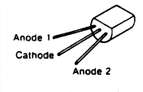
2SC2603EFG, 2SC3940A-Q



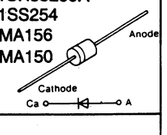
2SC2787L, SC3311A-Q 2SA1309Q

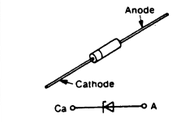


KV1260Z



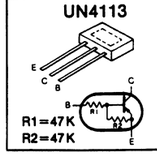
MA165, MA162A 1SR35200A 1SS254 MA156 MA150

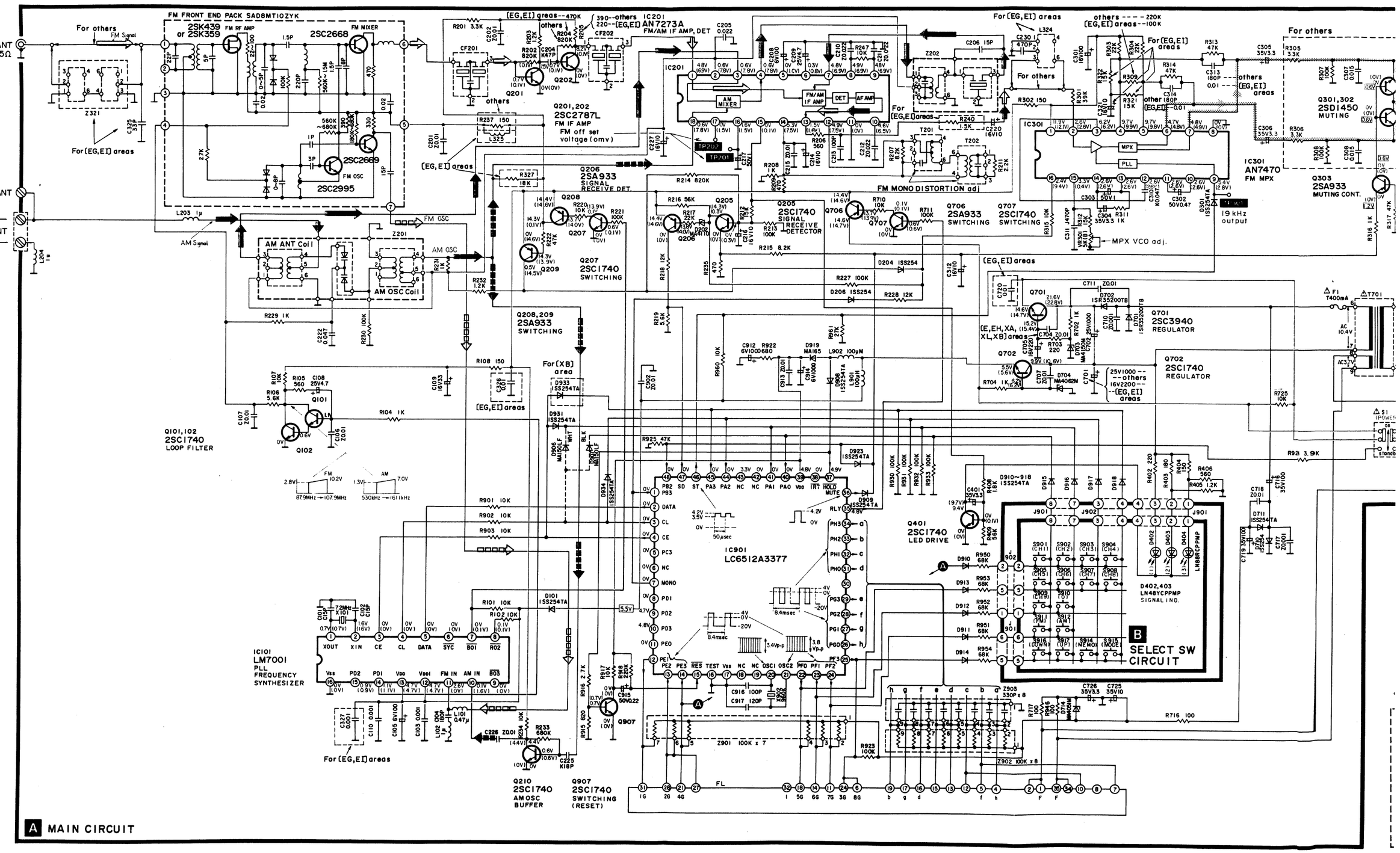


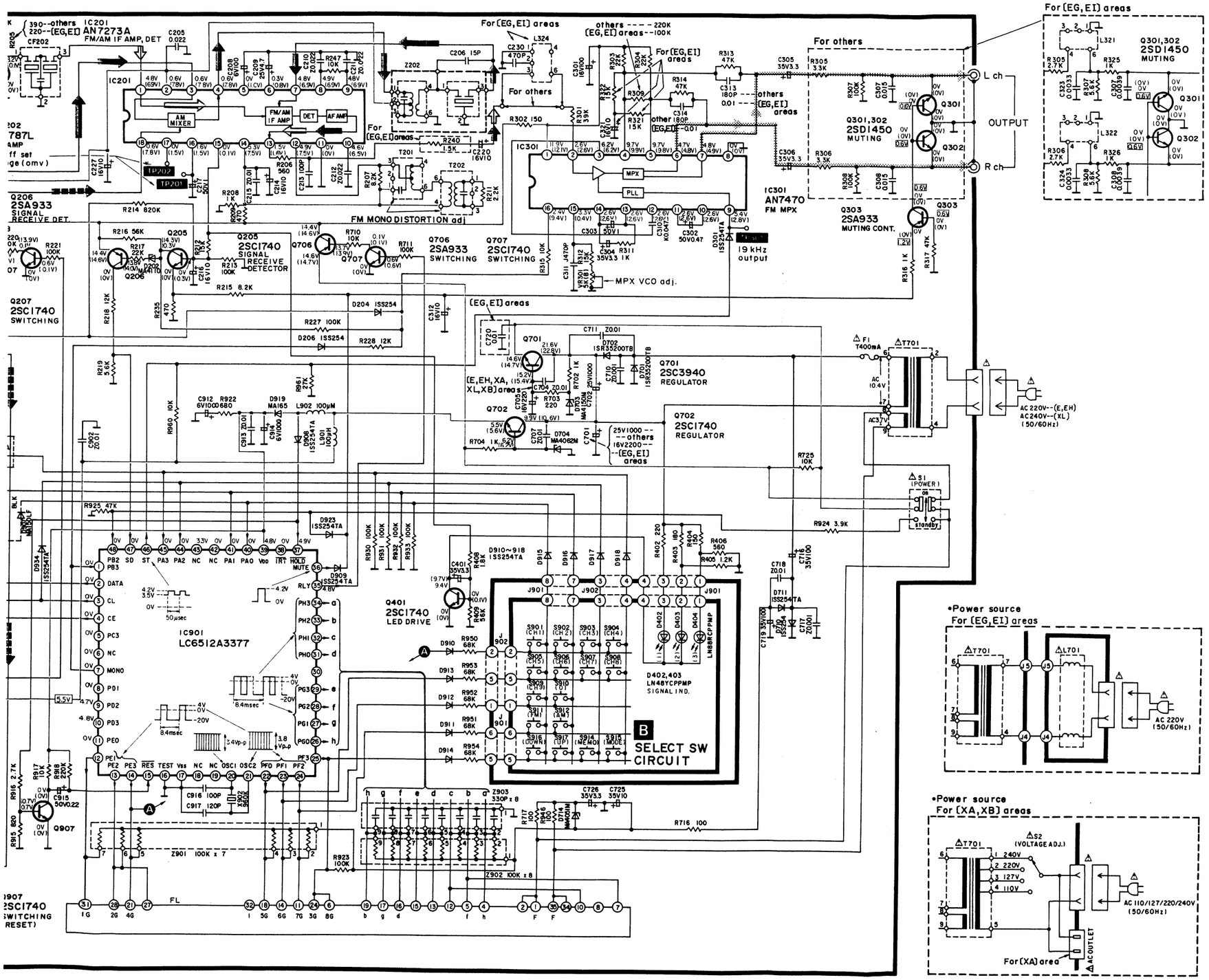


MA4051M, MA4062M, MA4110M, MA4150M

UN4113




FM ANT 75Ω
AM ANT
AM LOOP ANT
FM FRONT END PACK SADBMTIOZYK
2SK439 or 2SK359
FM RF AMP
2SC2668
FM MIXER
2SC2669
FM OSC
2SC2995
Z321
For others
FM Signal
For (EG,EI) areas
AM Signal
AM ANT Coil
AM OSC Coil
Z201
Z201
FM OSC
AM OSC
IC201
AN7273A
FM/AM IF AMP, DET
AM MIXER
FM/AM IF AMP
DET
AF AMP
Q201,202
2SC2787L
FM IF AMP
FM off set voltage (0mV)
Q201
Q202
Q206
2SA933
SIGNAL RECEIVE DET.
Q207
2SC1740
SWITCHING
Q208
Q209
Q208,209
2SA933
SWITCHING
Q205
2SC1740
SIGNAL RECEIVE DETECTOR
FM MONO DISTORTION adj
T201
T202
TP201
TP202
IC301
AN7470
FM MPX
MPX
PLL
MPX VCO adj.
Q303
2SA933
MUTING CONT.
Q301,302
2SD1450
MUTING
19 kHz output
Q706
2SA933
SWITCHING
Q707
2SC1740
SWITCHING
Q701
2SC3940
REGULATOR
Q702
2SC1740
REGULATOR
Q101,102
2SC1740
LOOP FILTER
Q101
Q102
Q210
2SC1740
AMOSC BUFFER
Q907
2SC1740
SWITCHING (RESET)
Q401
2SC1740
LED DRIVE
IC101
LM7001
PLL FREQUENCY SYNTHESIZER
IC901
LC6512A3377
D402,403
LN48YCPPMP
SIGNAL IND.
B
SELECT SW CIRCUIT
A
MAIN CIRCUIT
FL
Z901 100K x 7
Z902 100K x 8
Z903 330P x 8
For (XB) area
For (EG,EI) areas
For others
others ---- 220K
(EG,EI) areas ---100K
others ---- 470K
(EG,EI) areas---100K
390--others IC201
220--(EG,EI) AN7273A
others ---- 25V1000
16V2200
--(EG,EI) areas
FM 10.2V
AM 7.0V
87.9MHz → 107.9MHz
530kHz → 1611kHz



■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

Note 1:

- **S1** : Power source switch in "**on**" position.
- **S2** : Voltage selector in "240 V" position. (for [XA] and [XB] areas only)
- **S901~S910** : Preset tuning switch.
  S901: CH1, S902: CH2, S903: CH3, S904: CH4, S905: CH5, S906: CH6, S907: CH7, S908: CH8, S909: CH9, S910: CH0
- **S911** : FM select switch.
- **S912** : AM select switch.
- **S914** : Memory set switch. (manual ↔ auto memory)
- **S915** : FM mode switch.
- **S916** : Tuning (down) switch. [down: tuning to lower frequency]
- **S917** : Tuning (up) switch. [up: tuning to higher frequency]
- Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester. ( ): AM voltage
- ——— Positive voltage lines
  ▭▭▭▷ FM OSC
  ■■■■▶ AM OSC
  ▒▒▒▒ AF signal lines
  ⇒ FM signal
  ➡ AM signal
- Important safety notice
  Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

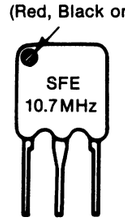
Note 2:

• Use of ceramic filters in pairs

The ceramic filters (CF201, CF202) for FM-IF circuit are available in three ranks. For this circuit, be sure to use the ceramics of the same rank in a pair.

At repairing and replacement, pay close attention to the diodes (D906, D907) for use as different diodes must be used depending on each rank of the ceramic filters.

Color marking
(Red, Black or White)



RANK (Color)	D906	D907	CENTER FREQUENCY
White	○	×	10.65MHz
Red	×	×	10.70MHz
Black	×	○	10.76MHz

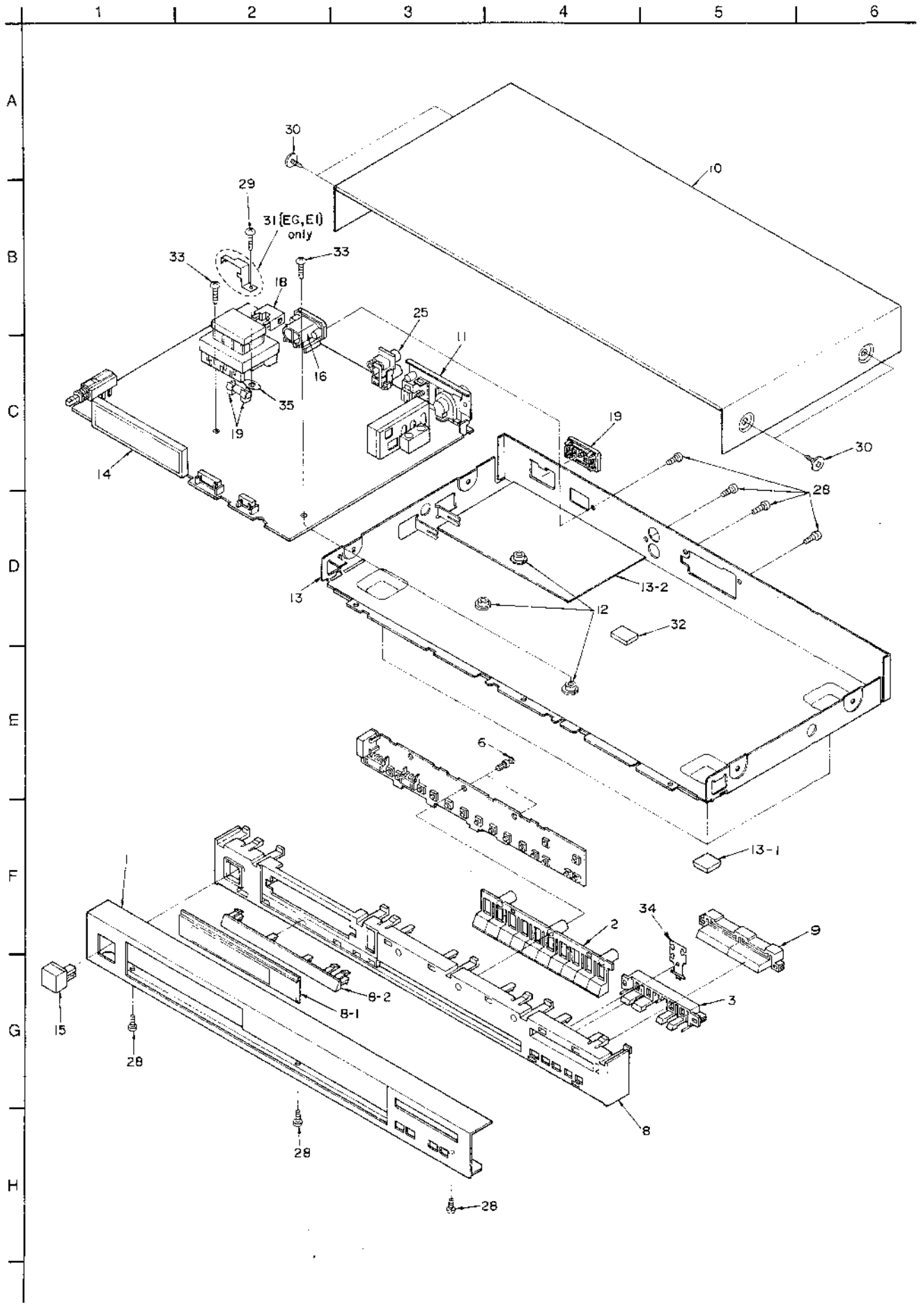
Note: ○ mark: Diode is used.
× mark: Diode is not used.

✱ Caution!

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.
✱ Cover the parts boxes made of plastics with aluminum coil.
✱ Ground the soldering iron.
✱ Put a conductive mat on the work table.
✱ Do not touch the legs of IC or LSI with the fingers directly.

ST-600

■ EXPLODED VIEW



■ REPLACEMENT PARTS LIST

Notes : * Important safety notice :
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.)
Parts without these indications can be used for all areas.

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC101	LM7001	I.C. PLL FREQUENCY
IC201	AN7273B	I.C. FM AM IFAMP
IC301	SVIUPC1161C3	I.C. FM MPX
IC901	LC6512A3377	I.C. MICRO COMPUTER
TRANSISTORS		
Q101	2SC1740SQ	TRANSISTOR
Q102	2SC1740SQ	TRANSISTOR
Q201	2SC2787L	TRANSISTOR
Q202	2SC2787L	TRANSISTOR
Q205	2SC1740SQ	TRANSISTOR
Q206	2SA933SQR	TRANSISTOR
Q207	2SC1740SQ	TRANSISTOR
Q208	2SA933SQR	TRANSISTOR
Q209	2SA933SQR	TRANSISTOR
Q210	2SC1740SQ	TRANSISTOR
Q301	2SD1330R	TRANSISTOR
Q302	2SD1330R	TRANSISTOR
Q303	2SA933SQR	TRANSISTOR
Q401	2SC1740SQ	TRANSISTOR
Q701	2SC3940AQSTA	TRANSISTOR
Q702	2SC1740SQ	TRANSISTOR
Q706	2SA933SQR	TRANSISTOR
Q707	2SC1740SQ	TRANSISTOR
Q907	2SC1740SQ	TRANSISTOR
DIODES		
D101	MA165	DIODE
D202	MA4110M	DIODE
D204	MA165	DIODE
D206	MA165	DIODE
D301	MA165	DIODE
D402	LN48YCPPMP	L.E.D
D403	LN48YCPPMP	L.E.D
D404	LN88RCPPMP	L.E.D
D701 ⚠	SVD1SR35200A	RECTIFIER
D702 ⚠	SVD1SR35200A	RECTIFIER
D703	MA4150M	DIODE
D704	MA4062-M	DIODE
D710	MA165	DIODE
D711	MA165	DIODE
D714	MA4051-M	DIODE
D906	MA162A	DIODE
D907	MA162A	DIODE
D908	MA165	DIODE
D909	MA165	DIODE
D910	MA165	DIODE
D911	MA165	DIODE
D912	MA165	DIODE
D913	MA165	DIODE
D914	MA165	DIODE
D915	MA165	DIODE
D916	MA165	DIODE
D917	MA165	DIODE
D918	MA165	DIODE
D919	MA165	DIODE
D923	MA165	DIODE
D931	MA165	DIODE
D933 (XB)	MA165	DIODE
D934	MA165	DIODE
VARIABLE RESISTORS		
VR301	EVND4AA00B53	MPX VCO
COILS AND TRANSFORMERS		
L101	RLQZPR47KT-Y	CHOKE COIL
L102	RLQZP1R2KT-Y	CHOKE COIL
L203	ELEPK1R0MA	COIL
L204	ELEPK1R0MA	COIL
L321	SLM1B9-P	MPX COIL
(EG, EI) L322	SLM1B9-P	MPX COIL
(EG, EI) L324	SLM1B10-M	COIL
(EG, EI) L325	RLQZPR47KT-Y	CHOKE COIL
(EG, EI) L701	SLQZ650MH49	CHOKE COIL
(EG, EI) L901	ELEXT101KA9	COIL
L902	ELEXT101KA9	COIL
T201	SLI48511-Z	I.F.TRANSFORMER
T202	SLI48513-Z	I.F.TRANSFORMER
T701 ⚠ (XL)	SLT5K244-S	POWER TRANSFORMER
T701 ⚠ (XA, XB)	SLT5K245-S	POWER TRANSFORMER
T701 ⚠ (EX, EH, EG) (EI)	SLT5K246-S	POWER TRANSFORMER
COMPONENT COMBINATIONS		
Z201	SLA2Z1-T	COIL
Z202	SLI7Z101-T	FREQUENCY TRANSFORMER
Z321	SLA4Z13-Z	ANTENNA COIL
(EG, EI) Z901	EXBF8E104J	COMBINATION COMPONENT
Z902	EXBF9E104J	COMBINATION COMPONENT
Z903	EXFP8331MW	COMBINATION COMPONENT
FILTERS		
CF201 (EX, EH, XA) (XL, XB)	SVFE107MS8-Q	CERAMIC FILTER
CF202 (EX, EH, XA) (XL, XB)	SVFE107MS8-Q	CERAMIC FILTER
OSCILLATORS		
X101	SVQ49U722-S	CRYSTAL OSCILLATOR
X902	EF0A960K04A	CERAMIC FILTER
DISPLAYS		
FL	SAD8MT10ZYK	DISPLAY TUBE
FRONT PACKS		
FE (EI, EG)	SNVFE337G01	TUNER
FE1 (EX, EH, XA) (XL, XB)	SNVFE203E01	TUNER
FUSES		
F1 ⚠	XBA2C04TB0	FUSE, T0.4A250V
SWITCHES		
S1	SSH1196-1	SW, POWER
S701 ⚠ (XA, XB)	SSR187-1	SW, VOLTAGE SELECTOR
S901	SSG13	SW, CH1
S902	SSG13	SW, CH2
S903	SSG13	SW, CH3
S904	SSG13	SW, CH4
S905	SSG13	SW, CH5
S906	SSG13	SW, CH6
S907	SSG13	SW, CH7
S908	SSG13	SW, CH8
S909	SSG13	SW, CH9
S910	SSG13	SW, CH0
S911	SSG13	SW, FM
S912	SSG13	SW, AM
S914	SSG13	SW, MEMORY SET
S915	SSG13	SW, FM MODE
S916	SSG13	SW, TUNING(DOWN)
S917	SSG13	SW, TUNING(UP)

Ref. No.	Part No.	Description
CABINET AND CHASSIS		
1 Ⓚ	SGWT600-KE	FRONT PANEL
1 Ⓢ	SGWT600-SE	FRONT PANEL
2 Ⓚ	SBC1005	BUTTON
2 Ⓢ	SBC1005-1	BUTTON
3 Ⓚ	SBC943-4	BUTTON
3 Ⓢ	SBC943-6	BUTTON
6	SHR415	LOCK PIN
8 Ⓚ	SGXT600-KE	PANEL
8 Ⓢ	SGXT600-SE	PANEL
8-1 Ⓚ	SGU594A	SHIELD PLATE
8-1 Ⓢ	SGU594B	SHIELD PLATE
8-2 Ⓚ	SGX9042A	ORNAMENT
8-2 Ⓢ	SGX9042-1A	ORNAMENT
9 Ⓚ	SBC1006	BUTTON
9 Ⓢ	SBC1006-1	BUTTON
10 Ⓚ	SKC1331BB	CABINET
10 Ⓢ	SKC1331S	CABINET
11 (EX, EH, EG) (EI)	SJF8305N	TERMINAL PLATE
11 (XA, XL, XB)	SJF8402N	TERMINAL PLATE
12	SHE170-1	SPACER
13 (EG)	SGPT600-EG	BOTTOM BOARD
13 (EH)	SGPT600-EH	BOTTOM BOARD
13 (EI)	SGPT600-EI	BOTTOM BOARD
13 (EX)	SGPT600-EK	BOTTOM BOARD
13 (XA)	SGPT600-XA	BOTTOM BOARD
13 (XB)	SGPT600-XB	BOTTOM BOARD
13 (XL)	SGPT600-XL	BOTTOM BOARD
13-1	SKL297-1	LEG,CASTER
13-2	SMX942	SHIELD SPACER
14	LN031441P	DIODE, GAASP
15 Ⓚ	SBC666-5	BUTTON, POWER
15 Ⓢ	SBC665	BUTTON, POWER
16 ⚠ (EG, EI)	SJS9231-1B	AC INLET
16 ⚠ (EX, EH, XA) (XL, XB)	SJS9236	AC INLET
17 (EG, EI)	SJS9231A	AC INLET COVER
18 (XA)	SJS9330B	AC OUTLET
19	SJS9330A	OUTLET COVER
19	SJT347	FUSE HOLDER
25	SJF3250	TERMINAL BOARD
26	SHR9855	HOLDER
28	XTBS3+8JFZ1	SCREW
29	XTBS3+12F1	SCREW
30 Ⓚ	SNE2129-3	SCREW
30 Ⓢ	SNE2129-2	ORNAMENT SCREW
31 (EG, EI)	SUS867	SPRING
32	SHG1613	RUBBER PARTS
33 Ⓚ	XTB3+12F	SCREW
34	SUS883	COIL SPRING
35	SNE55	BRACKET

Ref. No.	Part No.	Description
PACKING MATERIAL		
P1 Ⓚ (EX, EH, XA) (EG, XB)	SPG6190	PACKING CASE
P1 Ⓚ (EI)	SPG6193	PACKING CASE
P1 Ⓢ (EX, EH, XA) (EG)	SPG6191	PACKING CASE
P1 Ⓢ (XL)	SPG6192	PACKING CASE
P2 (EX, EH, XA) (EG, EI, XB)	SPS4584	CUSHION,PAD
P2 (XL)	SPS4584-2	PAD
P3 (EX, EH, XA) (EG, EI, XB)	SPS4585	PAD
P3 (XL)	SPS4585-1	PAD
P4	SPS4552	PAD
ACCESSORIES		
A1 ⚠ (XA, XB)	RJP120ZBS-H	AC PLUG ADAPTOR
A2	SJP2249-1	OUTPUT CORD
A3 (XA, XL, XB)	SSA269M	FM ANTENNA
A3 (EX, EH, EG) (EI)	SSA270M	FM ANTENNA
A4	SPF15	PROTECTION BAG
A5	SPB1139-1	AM LOOP ANTENNA
A6 (EX, EH)	SQF13139	INSTRUCTION BOOK
A6 (XA)	SQF13140	INSTRUCTION BOOK
A6 (EG)	SQF13141	INSTRUCTION BOOK
A6 (XL)	SQF13142	INSTRUCTION BOOK
A6 (XB)	SQF13143	INSTRUCTION BOOK
A6 (EI)	SQF13178	INSTRUCTION BOOK

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DEUTSCH

■ MESSUNGEN UND JUSTIERUNGEN

UKW JUSTIERUNGEN

Einstellungen der Bedienelemente und zu verwendende Geräte.

- UKW-Messender(UKW-MS)
- Stereo-Modulator
- Verzerrungs-Analystator
- Elektronische Gleichstrom-Voltmeter(EVM)
- Frequenzzähler
- Drosselspule(100μH)
- Widerstand(100kΩ)

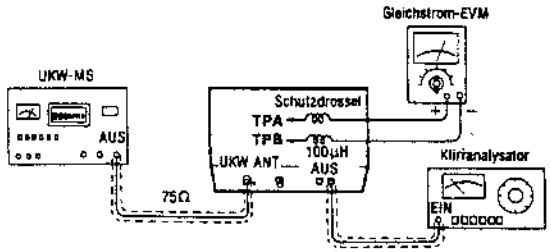
Anmerkung: Für Z201, Z202, Z321, L321, L322 und L324 werden bereits justierte Ersatzteile geliefert. Die Kerne dieser Teile daher nicht drehen.

UKW-MONO-VERZERRUNGS-JUSTIERUNG

1.Der Testaufbau ist in der Abbildung gezeigt.
2.Stellen Sie die Einheit auf **"FM(UKW)"** Betrieb.
3.Die Radiofrequenzanzeige und den Messender auf **100.10MHz** einstellen.
4.Den Kern von **T201** so justieren, daß die im Signalzustand gemessene Spannung **0mV (0±20mV)** im 300mV-Bereich beträgt.
5.**T202** so justieren, daß der Verzerrungsfaktor des linken Kanals minimal wird.
6.Schritte 4 und 5 einige Male wiederholen.
7.Versichern Sie sich, daß die Verzerrungsfaktoren von Kanal L und Kanal R annähernd gleich sind und auf ein Minimum gehalten sind.

Anmerkung:
Für die Justierung ist ein Schraubendreher aus Kunststoff zu verwenden.

ZUSTAND DES UKW-MESSENDERS
Modulation 100%
Modulationsfrequenz 1kHz
Ausgangspegel 66dB



TPA = TP201 , TPB = TP202

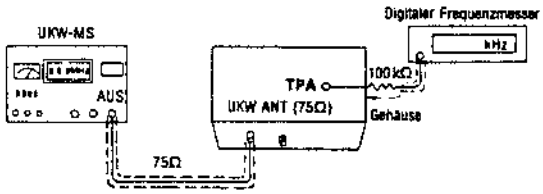
MPX-SGO-JUSTIERUNG

1.Der Testaufbau ist in der Abbildung gezeigt.
2.Den UKW-Bertriebsart-Wahlshalter in die **"on/auto"** Position stellen.
3.Radio und Meßsender auf **100.10MHz** einstellen.
4.**VR301** auf **19kHz ± 30Hz** auf der Frequenzzähleranzeige justieren.

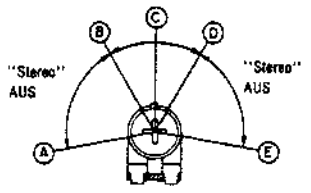
● VERWENDUNG EINES ALTERNATIVSYSTEMS

1.Stereosignal vom Meßsender eingeben oder eine Stereo-Sendung empfangen.
2.**VR301** justieren, bis die Stereo-Anzeige aufleuchtet. Den Arm von **VR301** mit Lack sichern, wie in der Abbildung gezeigt.

ZUSTAND DES UKW-MESSENDERS
Modulation 100%
Modulationsfrequenz 0kHz
Ausgangspegel 66dB



TPA = TP301



TPA

Ⓐ－Ⓑ,
Ⓓ－Ⓔ..... "Stereo" AUS Stellung
Ⓑ－Ⓓ..... "Stereo" EIN Stellung (Anzeigebeleuchtung)
Ⓒ..... Einstellpunkt des pilotschaltkreis'

TPA = VR301

UKW STEREO KLIRRFAKTOR-JUSTIERUNG

1.Der Testaufbau ist in der Abbildung gezeigt.
2.Stellen Sie die Einheit auf **"FM(UKW)"** Betrieb.
3.Die Radiofrequenzanzeige und den Messender auf **100.10MHz** einstellen.
4.**T1** so justieren, daß der Verzerrungsfaktor des linken Kanals minimal wird.
5.überprüfen, daß die Verzerrungsfaktoren des linken und rechten Kanals fast gleich sind.

Anmerkung:
Für die Justierung ist ein Schraubendreher aus Kunststoff zu verwenden.

ZUSTAND DES UKW-MESSENDERS
Modulation ....."L"order "R" Betriebsart 90%,Pilotssignal 10%
Modulationsfrequenz .....1kHz(Pilot 19kHz)
Ausgangspegel 66dB